

REMARKS

Status of Claims

Claims 1-13 are currently pending the application, of which claims 1, 2, 9, 11, and 12 are in independent form.

Claim 12 are presently amended, no claims are newly canceled, and claim 13 is newly added.

Objections to the Abstract

The Office Action objects to the Abstract “because it contains legal phraseology such as ‘means’ which should be avoided”, and requires correction under MPEP §608.01(b). Although no law or rule prohibits or has been interpreted to prohibit use of the term “means” in an Abstract (or elsewhere in a patent application), the Abstract is presently amended to remove “means” and to improve general readability. Withdrawal of the objection is respectfully requested.

Claim Rejections under 35 U.S.C. § 103(a)

a) The Office Action rejects claims 1, 2, 6, and 8-12 under § 103(a) as unpatentable over U.S. Patent No. 6,744,927 issued to *Kato* (hereinafter “Kato”) in view of the U.S. Publication No. 2004/0252903 of *Chen et al.* (hereinafter “Chen”).

b) Claim 3 is rejected under § 103(a) as being unpatentable over Kato in view of Chen and further in view of U.S. Patent No. 6,546,052 to *Maeda et al.* (hereinafter “Maeda”).

c) Claim 4 is rejected under § 103(a) as being unpatentable over Kato in view of Chen and further in view of the U.S. Publication No. 2005/0175251 of *Taketa et al.* (hereinafter “Taketa”).

d) Claim 5 is rejected under § 103(a) as being unpatentable over Kato in view of Chen and Taketa and further in view of the U.S. Publication No. 2005/0146610 of *Creamer et al.* (hereinafter “Creamer”).

e) Claim 7 is rejected under § 103(a) as being unpatentable over Kat in view of Chen and further in view of U.S. Patent No. 7,068,849 of *Zandi* (hereinafter “Zandi”).

The presently claimed invention

The present claims include a distinctive configuration in which, before orthogonal transform, a division into filtering regions is made and filtering processing using a low-pass filter is performed. On the basis of this configuration, the claimed invention uses characteristics of the orthogonal transform to reduce an image size. For example, Paragraph [0069] of the Specification explains that if regions obtained by vertically and horizontally dividing a JPEG block into equal $2k$ and $2m$ pieces, respectively, are set as filtering regions, the number of AC coefficients obtained by DCT processing can be suppressed to $k \times m$ or less. That is, in the present invention, input image data is divided into the filtering regions – each smaller than a block region – such that the block region becomes a cluster of rectangular regions obtained by equally dividing the block region by $2n$. Moreover, by attenuating a high frequency component of an unimportant region for each of the filtering regions, the AC coefficient is suppressed. By employing such a configuration, compressibility can be effectively improved.

Kato fails to disclose recited features.

Kato fails to disclose that the block region serving as a unit for the Discrete Cosine Transform (DCT) processing and the filtering region serving as a unit for performing the filtering processing attenuating the high frequency component are controlled to have a constant relationship. (E.g., “each of the rectangular regions being obtained by equally dividing each of said block regions by $2n$ ”.) According to the Office Action (see page 4), Kato describes that, on the basis of a result of distinguishing a “face area”, a quantized coefficient is controlled for each macroblock having 8×8 pixels, the DCT processing is performed on a 16×16 pixel basis according to the H.261 standard, and the determination of areas other than a face area is made for each of the rectangular regions obtained by dividing the block region by $2n$.¹

Performance of filtering processing to attenuate high frequency components of areas other than a face area is described in the second embodiment described by Kato. (See col. 6,

¹ H.261 prescribes macroblocks comprising a 16×16 array of luma samples and two corresponding 8×8 arrays of chroma samples, using 4:2:0 sampling. Presumably the asserted 8×8 “macroblock” refers to the portion of the macroblock consisting of arrays of chroma samples, as the portion of the macroblock consisting of luma samples is 16×16 .

lines 55-61.) However, the embodiment does not describe that the filtering processing is performed for each macroblock. That is, in Kato, in the case of controlling the quantized coefficient, the non-face area is determined for each macroblock, whereas in the case of performing the filtering processing, the unimportant region is determined without consideration of a block region. Accordingly, Kato does not describe the technical idea that by determining the unimportant region such that boundaries of the block region and unimportant region have a constant relationship, and performing the filtering processing, the compressibility is effectively improved.

Moreover, if DCT processing is performed, a space concept is lost and, therefore, an image cannot be divided after the DCT processing. For this reason, it is impossible to perform the DCT processing on a 16×16 pixel basis and then control the quantized coefficient on an 8×8 pixel macroblock basis. Therefore, in Kato, the quantized coefficient of the non-face area is not controlled for each of the rectangular regions obtained by dividing the block region by $2n$.

Chen fails to disclose recited features.

Chen's disclosure that a DWT coefficient is divided into sub-blocks of an image is not intended to attenuate or filter a high frequency region for each divided region, and therefore does not suggest the configuration of the present invention. Chen describes that a degree of importance of the DWT coefficient that is a two-dimensional region is evaluated for each of the sub-blocks to determine an important region. (See, e.g., ¶[0050].) The division into the sub-blocks means nothing more than calculating a score for each small region to determine a region having a high degree of importance, and is not intended to attenuate the high frequency component for each filtering region with respect to the unimportant region, differently from the present invention. Accordingly, the description in Chen does not suggest the configuration of the present invention in which the input image data is divided such that the boundaries of the block region and unimportant region have a constant relationship.

Note that Chen discloses that an "ROI" (region of interest) is made up of a plurality of $p \times p$ sub-blocks; however, the ROI in Chen refers to a unit constructed from "interested" sub-blocks, and therefore the DWT processing is not performed on an ROI basis. (See ¶[0038],

[0044].) Moreover, a compression system that performs the DWT processing is employed, and the orthogonal transform is not performed.

The applied references cannot reasonably be combined.

The features disclosed by Kato and Chen cannot reasonably be combined. Kato discloses that the important region and the unimportant region are distinguished from each other on the premise of the DCT processing, whereas Chen discloses that on the premise of the DWT processing, the DWT coefficient for the two-dimensional region is divided after the DWT processing. For this reason, the underlying idea is different between Kato and Chen. To combine them would require change of a basic principle of operation; hence, combining the references is not reasonable.

Specifically, Chen's literature describes that the DWT coefficient after the DWT processing is divided into sub-blocks, and the degree of importance is evaluated for each of the sub-blocks. (See ¶¶[0052]-[0059].) However, the evaluation method is intended to evaluate the degree of importance by comparing sub-blocks of high and low frequency regions of an image. For this reason, to apply the evaluation method it is essential that high and low frequency components of the image are separated into different regions by the DWT processing. That is, without performing the DWT processing, the method taught by Chen in which the DWT coefficient that is the two dimensional region is divided into sub-blocks is not applied to the invention involving the performance of the DCT processing as in the Kato's teaching. Accordingly, the features of Kato and Chen cannot reasonably be combined.

Also, the configurations described in Kato and Chen do not produce the result of the present invention. Therefore, it cannot be said that the present invention is obvious to one skilled in the art on the basis of the applied references. As described above, in the present invention input image data is divided into the filtering regions each smaller than the block region such that the block region becomes the cluster of the rectangular regions obtained by equally dividing the block region by $2n$. By attenuating the high frequency component of the unimportant region for each of the filtering regions, the AC coefficient is suppressed. By employing such a configuration, the unique working effect in which the compressibility can be effectively

improved is produced. As described above, Chen does not disclose performance of orthogonal transform, and therefore such working effect is not produced. Similarly, the configuration described by Kato does not produce such a working effect. Accordingly, the effect of the present invention is described in neither Chen nor Kato, nor by a combination thereof. Therefore, it cannot be said that the present invention is obvious to one skilled in the art on the basis of the applied references.

Accordingly, Applicant respectfully submits that independent claims 1, 2, 9, 11, and 12, which recite the above-discussed features, are in condition for allowance. Claims 3-8, and 10 are believed to be in condition for allowance for at least the same reasons as their base claims. Applicant requests withdrawal of the rejection, and reconsideration and allowance of the claims. Other applied references do not remedy the deficiencies of Kato and Chen.

New Claim

Claim 13 is newly added as supported by the specification. (See, e.g., ¶[0067].) Consideration of the new claim is respectfully requested.

Conclusion

In view of the above amendment, applicant believes the pending application is in condition for allowance.

Should there be any outstanding matters that need to be resolved in the present application, the Examiner is respectfully requested to contact James C. Larsen Reg. No. 58,565 at the telephone number of the undersigned below, to conduct an interview in an effort to expedite prosecution in connection with the present application.


If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37.C.F.R. §§1.16 or 1.17; particularly, extension of time fees.

Application No. 10/590,149
Amendment dated November 18, 2009
Reply to Office Action of August 18, 2009

Docket No.: 5090-0103PUS1


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